

(Recommendation Numbers had to be changed)
H-89-6 & -7 to H-89-22 & -23



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 21, 1989

In reply refer to: H-89-22 and -23

Honorable Robert E. Farris
Administrator
Federal Highway Administration
U.S. Department of Transportation
Washington, D.C. 20590

The National Transportation Safety Board has had a longstanding objective to improve safety at railroad/highway grade crossings. In 1985, several major grade crossing accidents involving heavy trucks with passenger trains prompted the Safety Board to investigate and focus on the grade crossing safety issue.¹ One of the safety issues discussed in the study was grade crossing physical characteristics, including roadway approach design, angle of intersection, and high-profile surfaces. Since the publication of the study, the Safety Board has investigated additional accidents which highlight the dangers of grade crossings.

Eighteen grade crossing accidents were discussed in the Safety Board's 1988 study of 189 heavy truck accident investigations.² Five of the 18 grade crossing accidents involved trucks becoming "hung up" on crossings with high-profile surfaces. In two of the five accidents, the trucks probably would have cleared the crossing had the driver chosen a different angle of approach (study case No. 83) or had the trailer's load been centered (study case No. 98). In three of the five accidents, trucks could not clear the crossing under the existing conditions.

On October 30, 1986, a Chicago South Shore and South Bend Railroad passenger train struck a Bell Diamond Express, Inc., tractor-lowboy semitrailer combination unit that became lodged on a grade crossing in Gary, Indiana. The trailer was destroyed and several cars of the train derailed. Several persons on the train were injured; the truckdriver was not injured. (Study case No. 167)

On November 12, 1986, a CSX Corporation freight train struck a Daniels Company tractor-lowboy semitrailer combination unit that became lodged on a grade crossing in Halifax, North Carolina. The truck was substantially damaged; 10 cars of the train were derailed. There were no injuries. (Study case No. 105)

¹ Safety Study--"Passenger/Commuter Train and Motor Vehicle Collisions at Grade Crossings (1985)" (NTSB/SS-86/04).

² Safety Study--"Case Summaries of 189 Heavy Truck Accident Investigations" (NTSB/SS-88/05).

On November 12, 1986, a CSX Corporation freight train struck a Pensacola Auto Auction tractor-semitrailer combination unit that became lodged on a grade crossing in College Park, Georgia. The truck was substantially damaged; the first two units of the locomotive sustained moderate damage. There were no injuries. (Study case No. 87)

The Safety Board also investigated another accident involving a truck at a high-profile grade crossing. On November 25, 1987, an Amtrak passenger train struck a U.S. Tunneling and Boring, Inc., tractor-lowboy combination unit that became lodged on a grade crossing in Seffner, Florida. The trailer and its cargo were damaged and several cars of the train were derailed. Several persons on the train were injured; the truckdriver left the vehicle before the collision.³

These grade crossing accidents highlight the absence of adequate vehicle ground clearance in designing and maintaining roadway profiles at grade crossings. In all of the cases cited, the low ground clearance of the semitrailer combined with the high profile surface of the grade crossing caused the semitrailer to become lodged on the track.

On August 25, 1983, an Amtrak passenger train struck an S.L. Balogh Trucking Company tractor-lowboy semitrailer combination unit that became lodged on a grade crossing in Rowland, North Carolina. The trailer and its cargo were destroyed and several cars of the train were derailed. Twenty-nine persons on the train were injured. The truckdriver left the vehicle before the collision.⁴

Following investigation of the 1983 accident, the Safety Board warned that crossing profiles with a vertical curve (hump) can impede the operation of a vehicle when the distance between any two axles of a vehicle span the hump and the height of the hump exceeds the vehicle's ground clearance. The report further stated that grade crossings that have a roadway profile that may be hazardous to certain vehicles should be identified and, once identified, improvements made.

Section 1.2 of the "Manual for Railway Engineering," published by the American Railway Engineering Association (AREA) states the following:

It is desirable that the surface of the highway be not more than 3 inches higher nor 6 inches lower than the top of nearest rail at a point 30 feet from the rail, measured at right angle thereto, unless track superelevation dictates otherwise.

Neither the Federal Highway Administration (FHWA) nor the American Association of State Highway and Transportation Officials (AASHTO) publishes similar guidelines. There was no evidence to indicate that the AREA guidelines were used at any of the

³ For more detailed information, read Field Accident Report No. ATL-88-F-R007.

⁴ Railroad/Highway Accident Report--"Collision of Amtrak Train No. 88 with Tractor Lowboy Semitrailer Combination Truck, Rowland, North Carolina, August 25, 1983" (NTSB/RHR-84/01.)

crossings involved in the previously cited accidents, nor was there evidence to indicate that maintenance on the surface of those crossings was coordinated between local authorities and the railroads.

During the investigation of the Rowland, North Carolina accident, a similar crash occurred in Citra, Florida, on November 30, 1983. The findings of that investigation were included in the Rowland, North Carolina accident report and prompted the Florida Department of Transportation to develop and implement a program to eliminate the hazard at grade crossings with high-profile surfaces in that State. The program included profile criteria, encouraged coordination between government and the rail industry in the construction and maintenance of grade crossings, and measures designed to identify crossings that would not accommodate low-clearance highway vehicles. In addition, Florida designed an advance warning sign that depicted a truck lodged on a truck. As high-profile crossings were identified, signs were installed on the approaches. All of the highways designated as State routes have been surveyed and signed where appropriate. The counties have been encouraged to do the same on routes they maintain. Since the inception of the program, cooperation and coordination between the State and the railroads have improved. A State official stated that both railroad and State personnel are involved in all new construction and maintenance at grade crossings over State routes.

Following the investigations of both the Rowland, North Carolina and Citra, Florida accidents, the Safety Board issued the following recommendation to the AASHTO:

H-84-69

Review the State safety program dealing with hazardous grade crossing profile conditions now underway in Florida, and promote the adoption within each State of this program or a comparable program developed by an appropriate AASHTO committee.

In response, the AASHTO stated that the recommendation would be forwarded to its Committee on Highways and Committee on Highway Traffic Safety. Pending action by the AASHTO committees, the Safety Board classified Safety Recommendation H-84-69 as "Open--Acceptable Action." In 1987, the Safety Board sent a followup letter to the AASHTO requesting the status on the recommendation. To date, there has been no response; the recommendation has been classified as "Open--Unacceptable Action."

As a result of its safety study on grade crossing collisions, the Safety Board issued the following recommendation to the FHWA:

R-86-50

Develop and require the use of advance warning signs that clearly inform motor vehicle drivers of particular dangers at grade crossings, including the warning of limited sight distance and high hump profile surface.

The FHWA responded to the recommendation by stating that the Manual on Uniform Traffic Control Devices (MUTCD) provides for the selection and installation of devices at crossings by the public agency with jurisdictional authority after a determination of need. Section 2C of the MUTCD does not elaborate on what additional warning signs may be used. The Safety Board continues to believe that, at a minimum, the MUTCD should indicate specifically that a sign depicting a high-profile crossing may be warranted at certain locations. Safety Recommendation R-86-50 is classified as "Open--Unacceptable Action."

The Safety Board also issued two recommendations to the Association of American Railroads (AAR) following the investigation of the Rowland, North Carolina accident:

R-84-35

Establish the specifications stated in Section 1.2, "Profile and Alignment of Crossings and Approaches," of the "Manual for Railway Engineering" of the American Railway Engineering Association as the minimum acceptable specifications for railroad/highway grade crossings.

R-84-36

Encourage all member railroads to coordinate activity related to track maintenance with local and State governments to preserve the integrity of the profiles at railroad/highway grade crossings.

In its response to Safety Recommendation R-84-35, the AAR stated that it had contacted its membership and encouraged them to appropriately use the recommended engineering practice cited in the recommendation. The AAR emphasized that it believed that the responsibility for setting specifications for highway grade crossing profiles belongs with the appropriate government agency. In its response to the AAR on June 19, 1985, the Safety Board disagreed with the AAR and stated that the responsibility is a joint one and demonstrated that by calling for AASHTO to address the problem as well. The Safety Board stated that the AAR should take an active role in issues involving grade crossing design. On November 16, 1987, the AAR sent a letter to all chief operating officers recommending that "appropriate consideration be given to AREA's recommended practice on this matter when coordinating crossing improvement and maintenance efforts with State and local highway agencies." Safety Recommendation R-84-35 was classified "Closed--Acceptable Alternate Action."

In response to Safety Recommendation R-84-36, the AAR stated that it fully supported the recommendation and encouraged its members to coordinate with appropriate government agencies "so as to preserve the integrity of the profiles at such crossings." In 1986, the AAR held several regional workshops on railroad/highway grade crossings. Railroad and government officials attended the workshops. High-profile grade crossings were discussed in the context of better coordination between the railroads and government agencies. The Safety Board classified Safety Recommendation R-84-36 as "Closed--Acceptable Action."

In a 1985 review of research needs, the FHWA identified the problem of high-profile crossings as a "most important" priority. The report recommended an objective:

To identify design criteria to determine what geometric conditions on approaches to grade crossings would create a hazard to low clearance vehicles and to develop geometric design criteria and traffic control systems for mitigating hazards.⁵

This objective was the exact thrust of the Safety Board's previous recommendations. Although the above objective was one of 10 designated as the most important priorities in grade crossing safety, the only project funded by the FHWA was a study on constant warning time.

Although quantitative data in the Rowland, North Carolina accident report do not indicate that high-profile surfaces at grade crossings are a statistically significant problem nationwide, the hazard is serious enough to warrant corrective measures comparable, at a minimum, to those taken by Florida in its program. The Safety Board still believes countermeasures should be initiated, particularly the identification of such crossings and the signing of crossings identified as hazardous to low-profile vehicles. If properly supported by the States, the program can substantially enhance safety at railroad/highway grade crossings.

As evidenced by the cases previously cited, truckdrivers continue to drive their vehicles onto and get lodged on grade crossings with high-profile surfaces. Until all such crossings are surveyed and appropriately signed, the Safety Board believes that a continuing effort, such as the FHWA issuing the On Guard Bulletin in March 1985,⁶ must be made to alert drivers to the dangers inherent at grade crossings with high-profile surfaces.

Therefore, the National Transportation Safety Board reiterates Safety Recommendation R-86-50 to the Federal Highway Administration and also recommends that the Federal Highway Administration:

Identify design criteria to determine what geometric conditions on approaches to grade crossings would create a hazard to low-clearance vehicles and to develop geometric design criteria and traffic control systems for mitigating hazards. (Class II, Priority Action) (H-89-22)

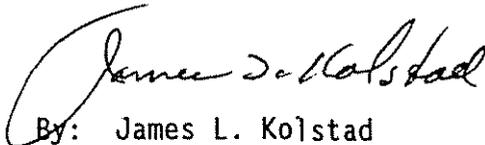
⁵ Federal Highway Administration, "Annual Review of Federally Coordinated Program (FCP) Project 10: Railroad Highway Grade Crossing Safety," 1985 (DTFH61-85-C-00054).

⁶ Federal Highway Administration. 1985. "Better Safe Than Sorry." On Guard Bulletin 16(2). Washington, D.C.

Reissue On Guard Bulletin "Better Safe Than Sorry," Volume 16, Number 2, dated March 1985, related to the hazards of railroad/highway grade crossings with high-profile surfaces. (Class II, Priority Action) (H-89-23)

Also as a result of its investigation, the Safety Board reiterated Safety Recommendation H-84-69 to the American Association of State Highway and Transportation Officials.

KOLSTAD, Acting Chairman, BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.


By: James L. Kolstad
Acting Chairman